DUPLICATE

WNCN 104.3 FM

GAF Broadcasting Company, Inc.

1180 Avenue of Americas
New York NY 10036

212 730 WNCN

GAF

July 31, 1991

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Station WNCN(FM), File No. BRH-910201WL

Dear Ms. Searcy:

GAF Broadcasting Company, Inc., licensee of Station WNCN(FM), New York, New York, hereby amends its above-referenced application for renewal of the license of WNCN, in accordance with the attached Engineering Report dated July 10, 1991, prepared by the consulting engineering firm of Silliman & Silliman. The amendment is to Exhibit 2 of the renewal application, which concerns RF radiation exposure. The original of the Engineering Report is being filed today together with an amendment to GAF's pending application for minor modification of the station's technical facilities (File No. BPH-910116IB).

Respectfully submitted,

Matthew Field
Senior Vice President
and General Manager

MF:as

ENGINEERING REPORT

SILLIMAN AND SILLIMAN

8121 GEORGIA AVENUE CONSULTING ENGINEERS SILVER SPRING, MD 209

New York, New York

FM RADIO STATIONS USING THE EMPIRE STATE MASTER FM ANTENNA

ABSTRACT

It is the purpose of this engineering statement to present a study of the possibility that buildings near the Empire State Building could be subjected to radiofrequency radiation levels in the order of the guideline of 1000 microwatts per square centimeter from the licensed operation of the FM stations on the Empire State Building when added to the illumination from all the other major sources of radiation from the building.

Since a number of FM stations have applications on file to move to a new master FM Antenna on the Empire State Building, it was decided to also make a study with the FM stations using the proposed master antenna system in addition to the study of the presently licensed situation.

ENGINEERING STUDY

A determination was made of the sources of radiofrequency radiation from the Empire State Building including pending applications for additional TV station use of the building. The sources are tabulated below.

In the tabulation to follow, one column has been entitled ERP-EQUIV. In this column, the ERP values of sources in the UHF band have been adjusted to represent the equivalent EMR at the FM frequency range so that a total radiofrequency radiation can be determined which includes the contributions of both FM frequency and UHF TV frequency sources.

In this determination a 600 MHz source would be permitted 2000 microwatts per Sq. Cm. which would be the equivalent of 1000 microwatts per Sq. Cm. at FM frequency. Hence, the power would be halved for its value in this column to produce a 100 MHz equivalent of 1000 microwatts per Sq. Cm. In addition, corrections for peak to average have been made in this column.

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ENGINEERING STUDY (CONT'D)

TABLE OF PRESENT RADIO AND TELEVISION SOURCES ON EMPIRE STATE BUILDING

CALL	FREQ(MHZ)	ERP-HP	ERP-VP	ERP-TOTAL	ERP-EQUIV
WNCN	104.3	7.8	5.5	13.3	13.3
WNEW-FM	102.7	7.8	5.6	13.4	13.4
WBAI	99.5	5.4	3.9	9.3	9.3
WRKS-FM	98.7	7.8	7.8	15.6	15.6
WQXR-FM	96.3	7.8	5.5	13.3	13.3
WXRK	92.3	7.6	5.4	13.0	13.0
WNSR	105.1	7.8	5.5	13.3	13.3
WLTW	106.7	7.8	5.5	13.3	13.3
WBLS	107.5	5.4	3.8	9.2	9.2
WCBS-FM	101.1	6.8	6.8	13.6	13.6
WPLJ	95.5	6.7	6.7	13.4	13.4
WQHT	97.1	6.7	6.7	13.4	13.4
CH-2 VIS	55.25	41.7	0.0	41.7	16.7
CH-2 AURAL	59.75	8.3	0.0	8.3	8.3
CH68 VIS	795.25	2630.0	2630.0	5260.0	793.7
CH68 AURAL	799.75	263.0	263.0	526.0	197.5
CH41 VIS	633.25	2365.0	2365.0	4730.0	896.3
CH41 AURAL	637.75	236.5	236.5	473.0	224.2
CH25 VIS	537.25	2450.0	0.0	2450.0	547.2
CH25 AURAL	541.75	245.0	0.0	245.0	135.7
100 megahertz total effective radiated power					2406.7

CALCULATIONS

From the above information, a calculation was made of the distance horizontally out from the radiating antennas on the Empire State Building to the point in space at which the EMR level would be equivalent to 1000 microwatts per Sq. Cm. at FM frequencies.

It was decided to do this based on extending Table 1, page 37 of Bulletin OST 65.

From the Table it will be noted that 100 kW H + V produces the guideline of 1000 microwatts per Sq. Cm. at a distance of 57.8 meters.

Apply an inverse distance squared adjustment and a direct power adjustment to find the distance at which 1000 microwats per Sq. Cm. would occur.

$$d^2 / 57.8^2 = 2407/100,\ d = 283.6 \text{ meters},\ = 930.3' = 0.176 \text{ mile}$$

From the above, a 1000 microwatt/Sq. Cm. power density equivalent would occur 930.3' from the tower at the elevation of the main lobe.

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New York, New York

CALCULATIONS (CONT'D)

Since the above extension of Table 1 is somewhat unconventional, it was decided to make the calculation by more conventional methods as follows:

1 kW into a half wave antenna produces a free space field of 0.138 Volts per meter at one mile.

This is converted to microwatts per Sq. Cm. as follows:

$$\frac{0.138^2}{377} \times 10^6 \times 10^{-4} = 0.005051 \text{ microwatts per Sq. Cm.}$$

Add 4 dB for reflection and get 0.012688 microwatts per Sq. Cm.

With 2407 kW the value at 1 mile would be 1828 X .012688 = 30.54 microwatts per Sq. Cm.

Apply the inverse distance squared law to find the distance at which the value would be 1000 microwatts per Sq. Cm.

$$(d/1)^2 = (30.54/1000), \quad d = 0.175 \text{ miles} = 922.7' = 281 \text{ meters}$$

Hence, the distance from the building in the main lobe at which the EMR level would equal the guideline, as calculated by conventional methods, agrees with the value obtained by extension of the Table in Bulletin OST 65.

Calculations were then made as above for vertical angles from 0.5 degree above the horizon to 10 degrees below the horizon. For these calculations use was made of the vertical radiation patterns on file with the FCC for the UHF stations. For directional TV stations the maximum value of radiation was used. The following results were obtained:

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OBSERVATIONS (CONT'D)

Furthermore, the closest building having a depression angle of 45 degrees or less from the building is more than 2000' from Empire State Building.

CONCLUSION

Based on the above, it may be safely concluded that the licensed operations from Empire State Building will not produce levels of radiofrequency radiation approaching the guideline value of 1000 microwatts per Sq. Cm. at FM frequency at or near the surface of any building in the surrounding area.

EXTENSION OF STUDY FOR OPERATION USING THE PROPOSED MASTER ANTENNA SYSTEM

A revised table of radio and television sources on the building was prepared using FM operations from the proposed Master Antenna System.

TABLE OF RADIO AND TELEVISION SOURCES ON EMPIRE STATE
WITH 15 STATIONS ON THE MASTER ANTENNA FOR A TOTAL OF 172.7 KW H + V

CALL	FREQ(MHZ)	ERP-HP	ERP-VP	ERP-TOTAL	ERP-EQUIV
15 FM STATIONS		86.4	86.4	172.7	172.7
WCBS-FM	101.1	6.8	6.8	13.6	13.6
WPLJ	95.5	6.7	6.7	13.4	13.4
WQHT	97.1	6.7	6.7	13.4	13.4
CH-2 VIS	55.25	41.7	0.0	41.7	16.7
CH-2 AURAL	59.75	8.3	0.0	8.3	8.3
CH68 VIS	795.25	2630.0	2630.0	5260.0	793.7
CH68 AURAL	799.75	263.0	263.0	526.0	197.5
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CH41 AURAL	637.75	236.5	236.5	473.0	224.2
CH25 VIS	537.25	2450.0	0.0	2450.0	547.2
CH25 AURAL	541.75	245.0	0.0	245.0	135.7
100 megahertz total effective radiated power					3032.7

By the same method which was used for consideration of present sources it was determined that the guideline radiation value would occur at a distance of 0.198 mile = 1044' = 318.3 meters. The vertical radiation pattern of the radiation will be close to that for the existing situation since the bulk of the radiation is from television sources.

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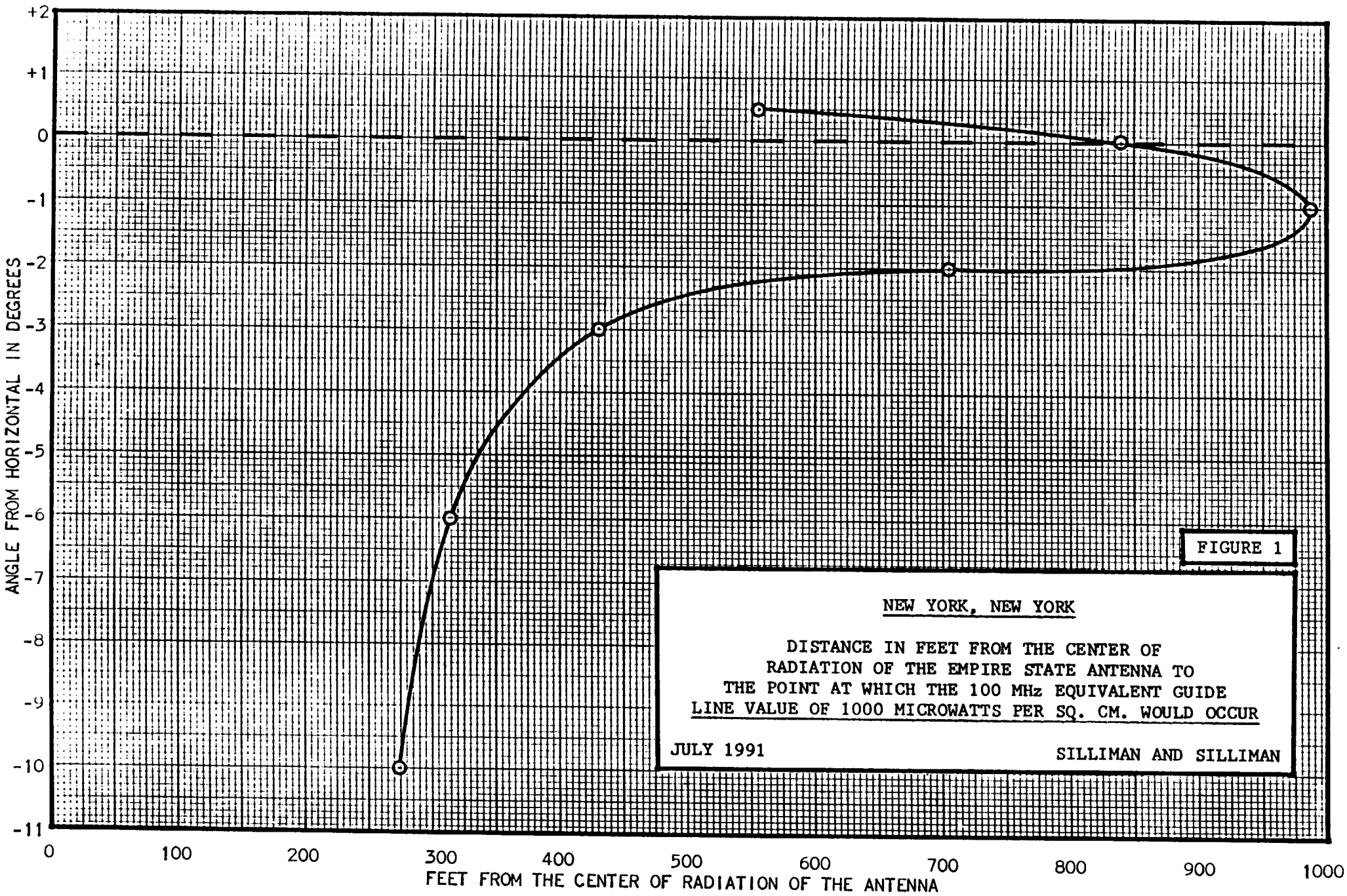
New York, New York

FURTHER CONCLUSION

It is further concluded that, with 15 FM radio stations operating from the proposed master antenna system, there would be no nearby building which would be illuminated by radiation equal to the guideline of 1000 microwatts per Sq. Cm. or the equivalent.

By Robert M. Silliman
July 10,1991


+2
+1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
ANGLE FROM HORIZONTAL IN DEGREES
0
100
200
300
400
500
600
700
800
900
1000
FEET FROM THE CENTER OF RADIATION OF THE ANTENNA
FIGURE 1
NEW YORK, NEW YORK
DISTANCE IN FEET FROM THE CENTER OF
RADIATION OF THE EMPIRE STATE ANTENNA TO
THE POINT AT WHICH THE 100 MHz EQUIVALENT GUIDE
LINE VALUE OF 1000 MICROWATTS PER SQ. CM. WOULD OCCUR
JULY 1991
SILLIMAN AND SILLIMAN

SILLIMAN AND SILLIMAN

8121 GEORGIA AVENUE CONSULTING ENGINEERS SILVER SPRING, MD 20910

New York, New York

A F F I D A V I T

MONTGOMERY COUNTY)
) SS:
STATE OF MARYLAND)

ROBERT M. SILLIMAN, being duly sworn upon oath deposes and says:

That his qualifications are a matter of record with the Federal Communications Commission;

That he is a registered professional engineer in Maryland, the District of Columbia and the Commonwealth of Virginia and is a partner in the firm of Silliman and Silliman;

That this firm has been retained by Empire State Users Group to prepare this engineering statement;

That he has either prepared or directly supervised the preparation of all technical information contained in this engineering statement and that the facts stated in this engineering statement are true of his knowledge except as to such statements as are herein stated to be on information and belief and as to such statements he believes them to be true.

Robert M. Silliman

Subscribed and sworn to before me this 10th day of July, 1991.

Cathy A. Ozdany, Notary Public

My Commission expires April 1, 1994.

(SEAL)